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ABSTRACT

This study compared student teachers' computer use in two universities--the University of Guam and a U.S. mainland university. Teacher education in the two universities took a different approach in providing computer training to preservice teachers. One offered a stand-alone computer training core course. The other integrated computer training into methods courses. The study focused on the manner and frequency of computer use by student teachers during the practicum, student teachers' perceptions of training adequacy, student teachers' attitudes towards the use of computers in teaching, and factors influencing student teachers' computer use. Results revealed that student teachers' computer use was limited in both universities. Implications of this finding and various ways of computer integration in teacher education programs are discussed. (Contains 5 tables and 18 references.) (Author/AEF)

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A Comparative Study of Student Teachers' Computer Use During the Practicum

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Abstract: This study compared students teachers' computer use in two universities. Teacher education in the two universities took a different approach in providing computer training to preservice teachers. One offered a stand-alone computer training core course. The other integrated computer training into methods courses. The result revealed that student teachers' computer use was limited in both universities. The author discussed the implication of the result and various ways of computer integration in teacher education programs.

Literature Review

Ever since the introduction of microcomputers into schools, teacher education has faced the challenge of preparing preservice teachers for successful integration of the computer into teaching practice. "An essential part of integrating technology into the educational curriculum is the training of persons who will ultimately use the technology" (Byrum & Cashmen, 1993; p. 259-260).

In response to this challenge, teacher education started to offer computer literacy courses. The goals of these courses were to provide preservice teachers with necessary computer skills and foster their positive attitudes towards computers. Most preservice teachers entered the college with no or limited computer experience and negative feelings towards computers (Summers, 1988; 1990).

These computer literacy courses had positive influence upon preservice teachers' computer experience and attitudes (Reed & Overbaugh, 1993; Savenye, 1992). This course model, however, was under the question when research showed that newly graduates who received computer training in teacher education programs were not more likely to use computers than those who had not. These studies focused on beginning teachers to evaluate their computer training in teacher education program (Novak & Knowles, 1991; Olive, 1994; p. 86). "The majority of beginning teachers were found to be making little use of computers" (Olive, 1994; p. 86). When they did use computers, there was "little evidence, however, that the teachers selected programs which provided relevant practice for the students. Many of the programs they used demonstrated weak instructional design and were only remotely related to the existing curriculum" (Novak & Knowles, 1991; p. 48).

A number of researchers studied student teachers' computer use as an alternative way to assess teacher education computer training programs. These studies produced similar results (Diem, 1989; Dunn & Ridgway, 1991a; 1991b; Downes, 1993). "The students, within this study, had, seemingly, mastered the necessary 'technical' expertise that would enable them to pass written and oral queries focusing on computer hardware and software.... they had difficulties developing classroom activities" (Diem, 1989; p. 35).

The computer literacy course was then criticized as a poor "tell and show" model of practice which offered isolated and discreet computer skills, but provided little opportunity for preservice teachers to explore the computer use in real classroom settings (Byrum & Cashman, 1993; Callister & Burbules, 1990; Robinson, 1993). It was argued that computers should be used in other educational courses, not merely in computer training courses, so that preservice teachers can embrace a broad range of computer applications and develop concepts of integrating computers into the curriculum. "Preservice teachers are receiving little exposure to the computers' role in education outside of technology courses....the uses of computers for teaching and learning should be modeled by all faculty, particularly those who teach in schools of education" (Byrum & Cashman, 1993; p. 269).

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However, this approach was not without problems. Faculty usually felt they neither had time nor expertise to model the computer use in their courses. Handler's study showed that computers received very limited use in teaching methods courses (1993). Preservice teachers mostly used word processing to complete assignments. Some reported to have experiences with software evaluation. "In the descriptions of the ways in which the computer was used in classes, there was very infrequent mention of it being used directly for instruction" (Handler, 1993; p. 150).

Vagel (1995) conducted a study on how the computer was being integrated into teaching methods courses in thirty-six exemplary institutions. These exemplary institutions were selected by a nominating committee for their service of providing instructional technology training to preservice teachers. All the exemplary institutions indicated they integrated the computer in the delivery of instruction in teaching methods courses, "but upon closer examination, the range of technologies employed are very limited" (Vagle, 1995; p. 244). Word processing was rated highest. CAI software was the second. The use of other types of software was extremely low such as desktop publishing, hypermedia and presentation software. Some applications were not used at all.

This study found it difficult for instructors of methods courses to develop expertise in technology use since they needed to "maintain a high level of expertise in their content fields" (Vagle, 1995; p. 242). These faculty indicated that they needed assistance from instructional technology experts in incorporating technology in the delivery of instruction.

A number of institutions have adopted team teaching approach. The idea of team teaching was that faculty could form a cooperative team in course offering. For example, faculty of methods courses could collaborate with faculty of instructional technology, utilizing each other's expertise in designing and teaching courses.

Handler (1993) described the opportunities offered to the faculty of teaching methods courses in his institution. The faculty of the Computer Education Department assisted their colleagues who were not competent computer users to develop lesson plans and co-taught methods courses. Handler predicted that this type of team work would better prepare the future teachers in the use of instructional technology.

This study compared student teachers' computer use during the practicum in two universities. Teacher education in the two universities took a different approach in providing instructional technology training to preservice teachers. One university offered a stand-alone instructional technology course. The other university integrated instructional technology into methods courses. This study focused on the manner and frequency of the computer use by student teachers during the practicum, student teachers' perception of their training adequacy, student teachers' attitudes towards the use of computers in teaching, and factors influencing student teachers' computer use.

Settings

One university was located on Guam, a U.S. territory in the West Pacific Rim . To assess the effectiveness of instructional technology (IT) training program, a study was conducted to investigate the student teachers' computer use during the practicum (Wang & Holthaus, in press). The study pointed to the need to restructure the IT program. In search for an ideal model of providing instructional technology experience to preservice teachers, another university from the U.S. mainland was selected for its alternative approach in IT training.

At the University of Guam, elementary education majors were required to take a three-credit computers in education course. The course taught computer literacy as well as classroom applications of educational software and tool software. The course was an option for secondary education majors. Students completed all the course work before they started a semester-long teaching practicum.

At the U.S. mainland university, instructional technology was integrated into elementary and secondary teaching methods courses. For example, a team of four faculty co-taught a seven-credit elementary integrated methods course which included methods of science (2 credits), mathematics (2 credits), social studies (2

credits), and instructional technology (1 credit). Students had the option of taking computer literacy courses as electives from other departments such as business, computer science, or library media.

Methodology

The total sample population for this study was 120 student teachers with 74 from the university in Guam and 46 from the U.S. mainland university. A questionnaire was developed containing 23 questions with a range of yes/no, multiple choice and Likert-type questions. One hundred and ten questionnaires were collected with the response rate of 100% from the university in Guam and 86% from the U.S. mainland university.

Findings

The results of the study were summarized in the following six tables. Background information is included in Table 1. Table 2 presents computing environment in practicum schools. Table 3, Table 4 and Table 5 summarize student teachers' comptuer use during the practicum. Table 6 compares student teachers' attitudes toward computer's role in teaching and their perception of computer training adequacy in teacher education programs.

	GUAM	U. S.
	%(n) Total N=64	%(n) Total N=46
Gender		
Male	20% (13)	20% (9)
Female	80% (51)	80% (37)
Age		
20-25	64% (41)	76% (35)
26-30	19% (12)	11% (5)
31-35	5% (3)	4% (2)
over 35	12% (8)	9% (4)
University Computer Courses Taken		
None	16% (10)	28% (13)
One	45% (29)	48% (22)
Two	19% (12)	13% (6)
Over Three	20% 13)	11% (5)
Types of Practicum Schools		
Elementary	70% (45)	59% (27)
Middle	5% (3)	4% (2)
High	25% (16)	20% (9)
Others		5% (8)

Table 1: Background Information

	GUAM	U. S.
	% (n) **N=64**	% (n) **N=46**
Computers Placement		
one computer shared between classroom	5% (3)	9% (4)
one computer in each classroom	3% (2)	57% (26)
computers in a lab	78% (50)	41% (19)
combination of above	11% (7)	28% (13)
Supervising Teachers' Computer Use		

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Yes	41% (26)	76% (35)
No	59% (38)	24% (11)
Other Teachers' Computer Use		
Yes	75% (48)	93% (43)
No	25% (16)	7% (3)

Table 2: Computing Environment in Practicum Schools

	GUAM	**U. S.**
	% (n) Total N=64	% (n) Total N=46
Computer Use While Student Teaching		
Yes	81% (50)	83% (38)
No	19% (12)	17% (8)
Frequency of Computer Use		
1-5 times	19% (11)	17% (7)
6-10 times	13% (7)	25% (10)
More than 10 times	68% (37)	58% (23)
Pattern of Computer Use		
personal use	34% (18)	27% (11)
used with children	21% (11)	15% (6)
used both personal and with children	45% (24)	58% (23)

Table 3: Computer Use during the Teaching Practicum

Rank	**Guam**	**Rank**	**U. S.**
1	drill and practice (53%)	1	game (57%)
2	tutorial (27%)	2	drill and practice (46%)
3	problem solving (27%)	3	problem solving (39%)
4	game (16%)	4	tutorial (27%)
5	simulation (13%)	5	simulation (20%)

Table 4: Types of CAI Software Used during the Practicum

Rank	**Guam**	**Rank**	**U. S.**
1	word processing (66%)	1	word processing (70%)
2	graphics (31%)	2	graphics (44%)
3	spreadsheet (14%)	3	multimedia authoring (24%)
4	telecommunication (9%)	4	database (17%)
5	database (6%)	5	spreadsheet (13%)
6	multimedia authoring (5%)	5	telecommunication (13%)

Table 5: Types of Tool Software Used during the Practicum

	Guam		**U. S.**	
	Mean	**SD**	**Mean**	**SD**
Importance of Computers in Teaching	2.95	.87	2.67	.90
Teaching Effectiveness and Computer Use	3.27	.75	3.26	.71
Being Prepared for Computer Use	3.32	.53	3.20	.70
Possibility of Computer Use in the Future Teaching	3.43	.76	3.41	.72

Table 6: Student Teachers' Attitudes and Perceptions

Discussion

This study found out that student teachers in the U.S. mainland university performed better in the computer use than those on Guam. Yet, their computer use was limited. A little more than half of student teachers (58%) used the computer both personally and with children . The use of word processing was rated highest. There was a sharp drop in the use of other tool software such as graphics, database, spreadsheet, telecommunication, and multimedia authoring. Student teachers' use of CAI software revealed a similar pattern. Game and drill software were the most commonly used. The use dropped with other types of CAI software.

Student teachers in the U.S. mainland university were exposed to the computer use in integrated methods courses, which was considered as an ideal model in providing computer training to preservice teachers. What accounted for this low and limited computer use?

A closer look at the integrated methods course syllabus revealed an inadequate computer use being covered. This was one-credit course for media integration. Due to the limited time, the use of some major computer tools were not included, for instance, multimedia authoring. The course taught basic instructional design theory, software evaluation, use of a computer writing program, the Internet, and computer graphs. This was too much for a one-credit course. There was no room left for in-depth exploration of each area. For example, the Internet assignment for this course was to locate a lesson plan and e-mail it to the instructor. The Internet use was not modeled as a powerful learning tool to help school students learn subject matters and develop their higher order thinking skills.

The findings of the study showed that integrated courses can not be glued together simply by course syllabi. "Preparation of teachers to teach in an interdisciplinary manner requires taking down the barriers erected between departments. This requires a willingness for communication, collaboration, and the abandonment of the safe haven of subject-matter expertise...." (Mason, 1996; p. 267). The ultimate goal of integrated courses is not to maintain the status quo of faculty in their own expertise domain. It should be taken as an opportunity for professional development. Faculty should observe each other's teaching and learn each other's expertise.

Technology integration is not one-way ticket. Not only can computers be integrated into methods courses, teaching methods and ideas can also be integrated into the computer literacy course. That will make computer learning more meaningful. Though this course model was severely criticized, it is imperative that preservice teachers have necessary computer skills. "A required computer course serves a valuable purpose. It is important for the student who comes to a program with little or no previous experience" (Handler, 1993; p. 153). While the emphasis is placed on learning computer skills, students can be exposed to ideas of teaching with computers. For example, teaching spreadsheet can be tied to how to use spreadsheet to manipulate and teach math concepts.

There is yet another area into which technology can be integrated and impact preservice teachers' computer use - teaching practicum. Teaching practicum is a crucial period for student teachers because their experiences of this period help to prepare their future teaching style. "It is in these experiences that education majors become acquainted with the realities of life in elementary and secondary classrooms, look for real-world connections to content presented in their university foundations and teaching methods classes, and develop their instructional and managerial skills" (Hunt 1995; p. 37).

Handler (1993) found that observation and participation in technology use during the practicum played a strong role in newly graduates' perception of being prepared. Dougdale (1994) described a successful integration of a computer course into student teaching experience. Students were required to design curriculum unit integrating the computer and implement their projects in the real classroom setting during the practicum. Both students and practicing teachers considered the experience worthwhile and valuable.

Conclusion

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Integrating computers into teaching practice is a complex process, impacted by many factors. Teacher education need to adopt multiple approaches to accomplish this goal. Offering computer literacy course, integrating computers into methods courses and teaching practicum all contribute to preparing future teachers in the use of instructional technology. As the world is racing towards the 21st century, few disagree that the computer will continue to impact our schools and societies. It is imperative that teacher education prepares their students for tomorrow's schools.

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